

WHAT IS CLAIMED IS:

1. A data transfer device for receiving first data transmitted from a first communication device, transmitting
5 the first data to another data transfer device connected to a second communication device that is a destination of the first data, receiving second data transmitted from the second communication device from the another data transfer device, and transmitting the second data to the first
10 communication device that is a destination of the second data, the data transfer device comprising:

a reception unit configured to receive the first data from the first communication device;

a cache unit configured to register cache data that
15 were transmitted to the another data transfer device in past, in correspondence to cache data names each of which is generated according to a content of each cache data and assigned to each cache data;

a processing unit configured to carry out a processing
20 for transmitting a first data name that is generated according to a content of the first data and assigned to the first data, instead of transmitting the first data, when the first data name is registered in the cache unit, or a processing for registering the first data in
25 correspondence to the first data name into the cache unit and transmitting the first data when the first data name is not registered in the cache unit, upon receiving the first data transmitted from the first communication device; and

a transmission unit configured to transmit the first
30 data name or the first data to the another data transfer device according to a processing carried out by the processing unit.

2. The data transfer device of claim 1, wherein the cache
35 unit registers the cache data names each of which is a

value obtained by compressing each cache data by a prescribed method, and the processing unit transmits or registers the first data name which is a value obtained by compressing the first data by the prescribed method,

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3. The data transfer device of claim 1, wherein the cache unit registers the cache data names each of which is a value obtained by applying a prescribed hash function to each cache data, and the processing unit transmits or registers the first data name which is a value obtained by applying the prescribed hash function to the first data.

4. The data transfer device of claim 1, wherein the processing unit also transmits the first data name to be assigned to the first name at a time of transmitting the first data to the another data transfer device as the first data name is not registered in the cache unit.

5. The data transfer device of claim 1, wherein the processing unit transmits the first data name and registers the first data into the cache unit at least with respect to a data of a reply message which is not null.

6. The data transfer device of claim 1, wherein the processing unit excludes data that satisfy a prescribed condition from targets for carrying out a registration into the cache unit.

7. The data transfer device of claim 1, wherein the data transfer device is connected to the first communication device through a local area network.

8. The data transfer device of claim 1, wherein the data transfer device is provided in a form of a software implemented on the first communication device.

9. The data transfer device of claim 1, wherein when the processing unit registers the first data received from the first communication device into the cache unit and the first data is a data of a reply message corresponding to a request message from the second communication device to the first communication device, the processing unit also registers a URL for requested data of the request message corresponding to the reply message in correspondence to the first data name into the cache unit or another cache unit; and

when the request message transmitted by the second communication device is received from the another data transfer device and the URL for the requested data of the request message is registered in the cache unit or the another cache unit, the processing unit also produces the reply message corresponding to the request message and destined to the second communication device according to the requested data registered in the cache unit or the another cache unit in correspondence to the first data name corresponding to the URL, and transmits the reply message to the another data transfer device.

10. The data transfer device of claim 9, wherein the reception unit receives the request message of a GET method.

11. The data transfer device of claim 1, wherein the data transfer device is connected to the first communication device which is a server device, while the another data transfer device is connected to the second communication device which is a client device.

12. The data transfer device of claim 1, wherein at a time of transmitting the second data received from the another

data transfer device to the first communication device, the processing unit also carries out a processing for registering the second data in correspondence to a second data name that is generated according to a content of the second data and assigned to the second data into the cache unit, when the second data name is not registered in the cache unit.

13. The data transfer device of claim 12, wherein when the second data is a data of a request message, the processing unit registers the second data into the cache unit upon receiving a reply message corresponding to the request message.

14. The data transfer device of claim 12, wherein when the second data is a data of a request message, the processing unit registers the second data into the cache unit before receiving a reply message corresponding to the request message.

15. The data transfer device of claim 12, wherein when the second data is formed by a plurality of unit data, the processing unit registers each one of all the unit data or a part of the unit data that satisfy a prescribed condition into the cache unit in correspondence to each unit data name that is generated according to a content of each unit data and assigned to each unit data.

16. The data transfer device of claim 15, wherein the second data is applied with a MIME encoding, and the processing unit obtains the unit data by decoding the MIME encoding.

17. A data transfer device for receiving first data transmitted from a first communication device through

another data transfer device, transmitting the first data to a second communication device that is a destination of the first data, receiving second data transmitted from the second communication device, and transmitting the second data to the another data transfer device connected to the first communication device that is a destination of the second data, the data transfer device comprising:

a reception unit configured to receive the first data or a first data name that is generated according to a content of the first data and assigned to the first data, from the another data transfer device;

a cache unit configured to register cache data that were received from the another data transfer device in past, in correspondence to cache data names each of which is generated according to a content of each cache data and assigned to each cache data;

a processing unit configured to carry out a processing for acquiring a cache data registered in correspondence to the first data name from the cache unit and transmitting an acquired cache data when the first data name is received from the another data transfer device, or a processing for registering the first data in correspondence to the first data name to be assigned to the first data into the cache unit and transmitting the first data when the first data is received from the another data transfer device; and

a transmission unit configured to transmit the acquired cache data or the first data to the second communication device according to a processing carried out by the processing unit.

18. The data transfer device of claim 17, wherein the cache unit registers the cache data names each of which is a value obtained by compressing each cache data by a prescribed method, and the processing unit registers the first data name which is a value obtained by compressing

the first data by the prescribed method,

19. The data transfer device of claim 17, wherein the
cache unit registers the cache data names each of which is
5 a value obtained by applying a prescribed hash function to
each cache data, and the processing unit registers the
first data name which is a value obtained by applying the
prescribed hash function to the first data.

10 20. The data transfer device of claim 17, wherein the
processing unit registers the first data in correspondence
to the first data name into the cache unit when the first
data name is received from the another data transfer device
along with the first data.

15 21. The data transfer device of claim 17, wherein the
processing unit transmits the acquired cache data or the
first data name and registers the first data into the cache
unit at least with respect to a data of a reply message
20 which is not null.

22. The data transfer device of claim 17, wherein the
processing unit excludes data that satisfy a prescribed
condition from targets for carrying out a registration into
25 the cache unit.

23. The data transfer device of claim 17, wherein the data
transfer device is connected to the second communication
device through a local area network.

30 24. The data transfer device of claim 17, wherein the data
transfer device is provided in a form of a software
implemented on the second communication device.

35 25. The data transfer device of claim 17, wherein when the

- processing unit registers the first data received from the another data transfer device into the cache unit and the first data is a data of a reply message corresponding to a request message from the second communication device to the first communication device, the processing unit also registers a URL for requested data of the request message corresponding to the reply message in correspondence to the first data name into the cache unit or another cache unit; and
- 10 when the request message is received from the second communication device and the URL for the requested data of the request message is registered in the cache unit or the another cache unit, the processing unit also produces the reply message corresponding to the request message
- 15 according to the requested data registered in the cache unit or the another cache unit in correspondence to the first data name corresponding to the URL, and transmits the reply message to the second communication device.
- 20 26. The data transfer device of claim 25, wherein the reception unit receives the request message of a GET method.
- 25 27. The data transfer device of claim 17, wherein the data transfer device is connected to the second communication device which is a client device, while the another data transfer device is connected to the first communication device which is a server device.
- 30 28. The data transfer device of claim 17, wherein at a time of transmitting the second data received from the second communication device to the another data transfer device, the processing unit also carries out a processing for registering the second data in correspondence to a
- 35 second data name that is generated according to a content

of the second data and assigned to the second data into the cache unit, when the second data name is not registered in the cache unit.

5 29. The data transfer device of claim 28, wherein when the second data is a data of a request message, the processing unit registers the second data into the cache unit upon receiving a reply message corresponding to the request message.

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30. The data transfer device of claim 28, wherein when the second data is a data of a request message, the processing unit registers the second data into the cache unit before receiving a reply message corresponding to the request message.

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31. The data transfer device of claim 28, wherein when the second data is formed by a plurality of unit data, the processing unit registers each one of all the unit data or a part of the unit data that satisfy a prescribed condition into the cache unit in correspondence to each unit data name that is generated according to a content of each unit data and assigned to each unit data.

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25 32. The data transfer device of claim 31, wherein the second data is applied with a MIME encoding, and the processing unit obtains the unit data by decoding the MIME encoding.

30 33. A data transfer method at a data transfer device for receiving first data transmitted from a first communication device, transmitting the first data to another data transfer device connected to a second communication device that is a destination of the first data, receiving second data transmitted from the second communication device from

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the another data transfer device, and transmitting the second data to the first communication device that is a destination of the second data, the data transfer method comprising:

5 receiving the first data from the first communication device;

judging whether a first data name that is generated according to a content of the first data and assigned to the first data is registered in a cache unit configured to
10 register cache data that were transmitted to the another data transfer device in past in correspondence to cache data names each of which is generated according to a content of each cache data and assigned to each cache data; and

15 carrying out a processing for transmitting the first data name, instead of transmitting the first data, when the first data name is registered in the cache unit, or a processing for registering the first data in correspondence to the first data name into the cache unit and transmitting
20 the first data when the first data name is not registered in the cache unit.

34. The data transfer method of claim 33, wherein when the processing for registering the first data received from the
25 first communication device into the cache unit is to be carried out and the first data is a data of a reply message corresponding to a request message from the second communication device to the first communication device, the carrying out step also registers a URL for requested data
30 of the request message corresponding to the reply message in correspondence to the first data name into the cache unit or another cache unit; and

when the request message transmitted by the second communication device is received from the another data
35 transfer device and the URL for the requested data of the

request message is registered in the cache unit or the another cache unit, the carrying out step also produces the reply message corresponding to the request message and destined to the second communication device according to the requested data registered in the cache unit or the another cache unit in correspondence to the first data name corresponding to the URL, and transmits the reply message to the another data transfer device.

35. The data transfer method of claim 33, wherein at a time of transmitting the second data received from the another data transfer device to the first communication device, the carrying out step also carries out a processing for registering the second data in correspondence to a second data name that is generated according to a content of the second data and assigned to the second data into the cache unit, when the second data name is not registered in the cache unit.

36. A data transfer method at a data transfer device for receiving first data transmitted from a first communication device through another data transfer device, transmitting the first data to a second communication device that is a destination of the first data, receiving second data transmitted from the second communication device, and transmitting the second data to the another data transfer device connected to the first communication device that is a destination of the second data, the data transfer method comprising:

receiving the first data or a first data name that is generated according to a content of the first data and assigned to the first data, from the another data transfer device; and

carrying out a processing for acquiring a cache data registered in correspondence to the first data name from a

cache unit configured to register cache data that were received from the another data transfer device in past in correspondence to cache data names each of which is generated according to a content of each cache data and
5 assigned to each cache data, and transmitting an acquired cache data when the first data name is received from the another data transfer device, or a processing for registering the first data in correspondence to the first data name to be assigned to the first data into the cache
10 unit and transmitting the first data when the first data is received from the another data transfer device.

37. The data transfer device of claim 36, wherein when the processing for registering the first data received from the
15 another data transfer device into the cache unit is to be carried out and the first data is a data of a reply message corresponding to a request message from the second communication device to the first communication device, the carrying out step also registers a URL for requested data
20 of the request message corresponding to the reply message in correspondence to the first data name into the cache unit or another cache unit; and

when the request message is received from the second communication device and the URL for the requested data of
25 the request message is registered in the cache unit or the another cache unit, the carrying out step also produces the reply message corresponding to the request message according to the requested data registered in the cache unit or the another cache unit in correspondence to the
30 first data name corresponding to the URL, and transmits the reply message to the second communication device.

38. The data transfer method of claim 36, wherein at a time of transmitting the second data received from the
35 second communication device to the another data transfer

device, the carrying out step also carries out a processing
for registering the second data in correspondence to a
second data name that is generated according to a content
of the second data and assigned to the second data into the
5 cache unit, when the second data name is not registered in
the cache unit.

39. A computer program product for causing a computer to
function as a data transfer device for receiving first data
10 transmitted from a first communication device, transmitting
the first data to another data transfer device connected to
a second communication device that is a destination of the
first data, receiving second data transmitted from the
second communication device from the another data transfer
15 device, and transmitting the second data to the first
communication device that is a destination of the second
data, the computer program product comprising:

a first computer program code for causing the computer
to receive the first data from the first communication
20 device;

a second computer program code for causing the
computer to judge whether a first data name that is
generated according to a content of the first data and
assigned to the first data is registered in a cache unit
25 configured to register cache data that were transmitted to
the another data transfer device in past in correspondence
to cache data names each of which is generated according to
a content of each cache data and assigned to each cache
data; and

30 a third computer program code for causing the computer
to carry out a processing for transmitting the first data
name, instead of transmitting the first data, when the
first data name is registered in the cache unit, or a
processing for registering the first data in correspondence
35 to the first data name into the cache unit and transmitting

the first data when the first data name is not registered in the cache unit.

40. The computer program product of claim 39, wherein when
5 the processing for registering the first data received from
the first communication device into the cache unit is to be
carried out and the first data is a data of a reply message
corresponding to a request message from the second
communication device to the first communication device, the
10 third computer program code also registers a URL for
requested data of the request message corresponding to the
reply message in correspondence to the first data name into
the cache unit or another cache unit; and

when the request message transmitted by the second
15 communication device is received from the another data
transfer device and the URL for the requested data of the
request message is registered in the cache unit or the
another cache unit, the third computer program code also
produces the reply message corresponding to the request
20 message and destined to the second communication device
according to the requested data registered in the cache
unit or the another cache unit in correspondence to the
first data name corresponding to the URL, and transmits the
reply message to the another data transfer device.

41. The computer program product of claim 39, wherein at a
time of transmitting the second data received from the
another data transfer device to the first communication
device, the third computer program code also carries out a
30 processing for registering the second data in
correspondence to a second data name that is generated
according to a content of the second data and assigned to
the second data into the cache unit, when the second data
name is not registered in the cache unit.

42. A computer program product for causing a computer to function as a data transfer device for receiving first data transmitted from a first communication device through another data transfer device, transmitting the first data to a second communication device that is a destination of the first data, receiving second data transmitted from the second communication device, and transmitting the second data to the another data transfer device connected to the first communication device that is a destination of the second data, the computer program product comprising:

a first computer program code for causing the computer to receive the first data or a first data name that is generated according to a content of the first data and assigned to the first data, from the another data transfer device; and

a second computer program code for causing the computer to carry out a processing for acquiring a cache data registered in correspondence to the first data name from a cache unit configured to register cache data that were received from the another data transfer device in past in correspondence to cache data names each of which is generated according to a content of each cache data and assigned to each cache data, and transmitting an acquired cache data when the first data name is received from the another data transfer device, or a processing for registering the first data in correspondence to the first data name to be assigned to the first data into the cache unit and transmitting the first data when the first data is received from the another data transfer device.

43. The computer program product of claim 42, wherein when the processing for registering the first data received from the another data transfer device into the cache unit is to be carried out and the first data is a data of a reply message corresponding to a request message from the second

communication device to the first communication device, the
second computer program code also registers a URL for
requested data of the request message corresponding to the
reply message in correspondence to the first data name into
5 the cache unit or another cache unit; and

when the request message is received from the second
communication device and the URL for the requested data of
the request message is registered in the cache unit or the
another cache unit, the second computer program code also
10 produces the reply message corresponding to the request
message according to the requested data registered in the
cache unit or the another cache unit in correspondence to
the first data name corresponding to the URL, and transmits
the reply message to the second communication device.

15 44. The computer program product of claim 42, wherein at a
time of transmitting the second data received from the
second communication device to the another data transfer
device, the second computer program code also carries out a
20 processing for registering the second data in
correspondence to a second data name that is generated
according to a content of the second data and assigned to
the second data into the cache unit, when the second data
name is not registered in the cache unit.